

## REMARKS

In view of the rejections raised in the Office Action dated January 25, 2007, the claims been amended in order to comply with the Examiner's requirements, as outlined herebelow:

Claims 2-5 have been amended to replace "The composite sol gel solution" with --The composite sol gel formulation--, to be consistent with the preamble of their parent claim.

Claim 13 has been amended to correct the expression "sold gel" with --sol gel--.

The Applicant thanks the Examiner for identifying these defects and kindly suggesting appropriated amendments.

In regard to §112 objections, claim 1 has been amended to replace the expression "said coating layer" with the term "slurry".

Claim 1 has been amended to more clearly and succinctly claim the present invention and recite some of the subject matter from claim 2, as follows:

"wherein said sol gel solution ~~has~~ contains an acid and said metal alkoxide in a molar ratio selected to cause said sol gel solution to form an expanded and ~~preferably~~ discontinuous gel network;"

Claim 2 has also been amended to reflect the amendments to its parent claim1.

It is respectfully submitted that the amendments made herein are to more particularly and succinctly recite the invention and to the correct editorial errors in the drawings. All the amendments are supported by the application as originally filed, and therefore no new matter has been added.

## **Patentability of Claims Over the Cited References**

The Examiner has rejected claims 1-20 as anticipated by or, in the alternative, as obvious over Barrow et al. (US Patent No. 5,585,136). In the detailed reasoning behind this finding, the Examiner has also indicated that while the composite sol gel of the cited reference might not be made by the same process, the composite sol gel disclosed is the same as being claimed.

The Applicant respectfully requests the Examiner to withdraw the rejection in view of the above-noted amendments and the following comments.

Claim 1 has been amended to recite:

“wherein said sol gel solution contains an acid and said metal alkoxide in a molar ratio selected to cause said sol gel solution to form an expanded and discontinuous gel network;”

Applicant respectfully submits that the conventional polymeric sol-gel, such as that disclosed in Barrow et al., form a polymerized gel structure on deposition that is comparably dense and continuous. On drying and firing, this gel network formed from conventional sol-gel binders is strained and cracks at some maximum thickness for a given substrate.

On the contrary, the present claimed invention, as specifically defined in amended claim 1, leads to the development of a sol-gel binder that has an **expanded** and **discontinuous** gel network. The maximum thickness of the resulting coating can be significantly increased through use of the sol-gel composite binder formulations as they have a more porous structure due to the expanded gel network through adjustment of the acid ratio, and can hence accommodate greater residual strains in the coating. It is respectfully submitted that Barrow et al. do not disclose or even remotely suggest these features.

The sol-gel binders in the claimed invention also may form discontinuous gel masses in solution which also lead to increasing crack-free thickness due to additional flexibility in managing residual coating strain. This is also one of the improvements over the continuous gel networks formed by conventional polymeric sol gel binders in Barrow et al.

Accordingly, it is respectfully submitted that the composite sol gel formulation defined in amended claim 1 is patentably different from the sol gel disclosed in Barrow et al.

With respect to dependent claim 4, it is submitted that deposition of the conventional sol-gel coatings is limited particularly in dip coating and screen printing due to its lack of thixotropy. In dip coating, the thickness of a deposited layer is affected both by the rate of solvent evaporation and the viscosity of the solution. The conventional sol-gel composite formulations in the cited reference, Barrow et al., are relatively constant in viscosity and lead to the deposition of relatively thin layers by dip coating.

On the other hand, the sol-gel composite formulation of the claimed invention can have their rheology adjusted through control of the acid ratio to obtain thixotropic formulations that can be shear thinned to flow but will quickly "set up" to a much greater viscosity". Increased wet coating thicknesses can be obtained in both dip coating and screen printing through the development of these thixotropic formulations which are not described in Barrow et al.

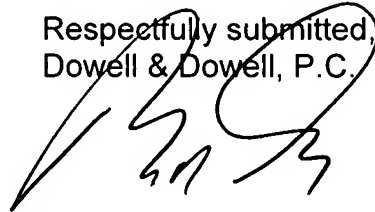
In view of the foregoing discussion and the amendments, it is respectfully submitted that claim 1, and all the claims depending therefrom, recite the subject matter which is new and inventive over Barrow et al.

An earnest effort has been made to place this application in condition for allowance which action is respectfully solicited. Should the Examiner have any

questions or require anything further, it would be appreciated if the Examiner would contact the undersigned attorney-of-record at the telephone number shown below for further expediting the prosecution of the application.

Respectfully submitted,  
Dowell & Dowell, P.C.

By:

A handwritten signature in black ink, appearing to be 'R. A. Dowell', written over a circular stamp or mark.

Ralph A. Dowell, Registration No.  
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